CLAIM AMENDMENTS

Please amend claim 1, 2, 14, 17, 20 as follows:

1. (Currently Amended) A physical neural network based on molecular technology, comprising:

a dipole-induced connection network comprising a plurality of molecular conducting connections suspended in a solution within a connection gap formed between at least one input electrode and at least one output electrode, wherein at least one molecular connection of said plurality of molecular conducting connections can be strengthened or weakened according to an application of an electric field across said connection gap; and

a plurality of physical synapses formed from said molecular conducting connections of said connection network.

2. (Currently Amended) The physical neural network of claim 1 further comprising a gate located adjacent said connection gap, and insulated from electrical contact by an insulation layer ~~such as, for example, silicon dioxide~~.

3. (Original) The physical neural network of claim 2 wherein said gate is connected to logic circuitry which can activate or deactivate individual physical synapses among said plurality of physical synapses.

4. (Original) The physical neural network of claim 2 wherein said gate is connected to logic circuitry which can activate or deactivate groups of physical synapses of said plurality of physical synapses.

5. (Original) The physical neural network of claim 1 wherein said molecular conducting connections comprise semi-conducting molecular structures.

6. (Original) The physical neural network of claim 5 wherein said semi-conducting molecular structures comprise semi-conducting nanotubes.

7. (Original) The physical neural network of claim 5 wherein said semi-conducting molecular structures comprises semi-conducting nanowires.

8. (Original) The physical neural network of claim 5 wherein said semi-conducting molecular structures comprise semi-conducting nanoparticles.

9. (Original) The physical neural network of claim 1 wherein said at least one input electrode comprises a pre-synaptic electrode and said at least one output electrode comprises a post-synaptic electrode.

10. (Original) The physical neural network of claim 9 wherein a resistance of said molecular conducting connections bridging said at least one pre-synaptic electrode and said at least one post-synaptic electrode is a function of a prior electric field across said at least one pre-synaptic electrode and said at least post-synaptic electrode.

11. (Original) The physical neural network of claim 9 wherein at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof.

12. (Original) The physical neural network of claim 9 wherein a shape of at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof.

13. (Original) The physical neural network of claim 11 wherein said physical neural network comprises an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode.

14. (Currently Amended) The physical neural network of claim 1 wherein said molecular electrically conducting connections comprise molecular electrically conducting structures suspended and free to move about within said solution, said solution comprising a non-electrically conducting solution.

15. (Original) The physical neural network of claim 1 wherein said molecular conducting connections comprise molecular semi-conducting structures suspended within a non-conducting solution.

16. (Original) The physical neural network of claim 1 wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said molecular conducting connections thereof.

17. (Currently Amended) A physical neural network based on molecular technology, comprising:

a dipole-induced connection network comprising a plurality of molecular conducting connections suspended in a solution within a connection gap formed between at least one input electrode and at least one output electrode, wherein at

least one molecular connection of said plurality of molecular conducting connections can be strengthened or weakened to an application of an electric field across said connection gap;

a plurality of physical synapses formed from said molecular conducting connections of said connection network;

a gate located adjacent said connection gap and which is insulated from said connection network; and

wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said molecular conducting connections thereof.

18. (Original) The physical neural network of claim 17 wherein said molecular conducting connections comprise molecular conducting structures suspended within a non-conducting solution.

19. (Original) The physical neural network of claim 17 wherein said molecular conducting connections comprise molecular semi-conducting structures suspended within a nonconducting solution.

20. (Currently Amended) An adaptive physical neural network based on molecular technology, comprising:

a dipole-induced connection network comprising a plurality of molecular conducting connections suspended in a solution within a connection gap formed between at least one pre-synaptic electrode and at least one post-synaptic electrode, wherein at least one molecular connection of said plurality of molecular conducting connections can be strengthened or weakened to an application of an electric field across said connection gap and said at least one pre-synaptic electrode and said at least one post-synaptic electrode;

a plurality of physical synapses formed from said molecular conducting connections of said connection network;

a gate located adjacent said connection gap and which is insulated from said connection network;

wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said molecular conducting connections thereof;

wherein said adaptive physical neural network which is trainable based on at least one generated pulse across said at least one pre-synaptic electrode and at least one pulse generated across said at least one post-synaptic electrode; and

wherein a resistance of said molecular conducting connections bridging said at least one pre-synaptic electrode and said at least one post-synaptic electrode is a function of a prior electric field across said at least one pre-synaptic electrode and said at least post-synaptic electrode.